

Advisory Committee on Acoustic Impacts on Marine Mammals

Sponsored by the Marine Mammal Commission

**Third Meeting
July 27-29, 2004**

San Francisco, California

Meeting Summary

Prepared by the Facilitation Team of

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Meeting Summary

The third meeting of the Advisory Committee on Acoustic Impacts on Marine Mammals was held on July 27-29, 2004 in San Francisco, California. The Advisory Committee, convened by the Marine Mammal Commission, is comprised of a diverse group of representatives of entities that produce sound in the marine environment, government agencies with responsibilities or activities significant to marine mammals, academic researchers, and non-governmental environmental and animal welfare organizations. The objectives of this meeting were to:

- Review draft report from Subcommittee on Synthesis of Current Knowledge and determine next steps to address what is known, uncertain, not known, or not agreed upon;
- Establish a common knowledge base for Committee members on marine mammal research and funding processes;
- Discuss key issues that need to be addressed to overcome potential and perceived barriers to research that advances our knowledge about acoustic impacts on marine mammals, and develop preliminary recommendations on those issues where possible; and
- Review progress of Subcommittee on Management and Mitigation and determine next steps.

What follows is a summary of the presentations and discussions at this meeting.

DAY ONE – Tuesday, July 27, 2004

Welcome and Introductions

Suzanne Orenstein, Facilitator, opened the meeting by inviting Committee members, their alternates and Committee staff, facilitators and observers to introduce themselves. A list of meeting attendees is attached (Attachment A). Ms. Orenstein reminded participants that Mark Dantzker of Cornell University would be producing an audio recording of the meeting. Anyone wishing to acquire a copy of the recording should make arrangements directly with Mr. Dantzker.

David Cottingham, Executive Director of the Marine Mammal Commission, welcomed participants to the meeting, and pointed out that the format for this meeting would be a departure from the first two meetings, with far less emphasis on presentations and more direct interaction and discussion among Committee members. He noted that disagreement on some issues is to be expected and urged Committee members to talk constructively, respectfully and directly to one another in a joint effort to move forward. He also highlighted the fact that there will be a long time before the next plenary (November 30-December 2) in New Orleans and encouraged members to stay engaged and in touch on various issues over that interim so that momentum is not lost.

Agenda for this Meeting

Suzanne Orenstein briefly reviewed the agenda for the meeting. She emphasized that the primary focus of the meeting would be on what it will take to move forward with research to gather information needed to inform decision making and reduce the level of controversy. Issues on the agenda related to research needs and barriers were taken from the Assessment Report prepared by the facilitators in preparation for establishing the Advisory Committee (available at <http://www.mmc.gov/sound>). Ms. Orenstein invited comments or questions on the agenda and received the following suggestions:

- There was a request from several Committee members for time on the agenda to informally present and discuss the recent report on anthropogenic sound issues by the International Whaling Commission (IWC).
- John Hildebrand requested that the presentation of his efforts with Ken Balcomb and Bob Gisiner to look at exposure levels in the 2000 Bahamas stranding event be moved to a later point on the agenda to allow them to continue to work together to refine their analyses and prepare their presentation. It was agreed to switch their time slot with the update on the International Workshop.
- There was a request to initiate a protocol for tracking different versions of documents circulated to Committee members to prevent confusion.

Update on Action Items from Meeting Two

Discussion of How the Advisory Committee Could Address Overlap with Recommendations From the U.S. Commission on Ocean Policy and the Pew Oceans Commission

The Committee discussed whether and how its efforts overlap with the ongoing processes regarding recommendations from the U.S. Commission on Ocean Policy and the Pew Oceans Commission. Penny Dalton, Committee representative from the Consortium for Oceanographic Research and Education (CORE), provided an overview of the schedule and steps being taken to finalize the recommendations of the U.S. Commission on Ocean Policy, noting that action on the recommendations by Congress may be ongoing in February 2005, when the Advisory Committee is expected to be developing its final report. Joel Reynolds of NRDC provided an overview of the next steps on the Pew Ocean Commission recommendations, noting that they differed somewhat from those of the U.S. Commission on Ocean Policy, especially on the topic of mitigation.

After discussion, the Committee agreed to develop its own recommendations first, and then examine how they overlap with recommendations from these two related efforts. Committee members were especially interested in identifying areas where the Advisory Committee could support recommendations from the Commissions and from the previous National Research Council (NRC) panels on this issue, or where the other efforts were supportive of needs and recommendations identified by the Advisory Committee. Potential areas of overlap and possibly mutual support were suggested, including recommendations on funding ocean research, permitting of activities in the ocean, and funding for the regulatory agencies. The Committee agreed to highlight in its final report where its recommendations are consistent with those of the Commissions and the NRC panels, and it was suggested that the Committee note where its recommendations do not overlap, or differ from, the

others. A member suggested that the Committee might want to explain why it is silent on specific recommendations by the other bodies, but this was left as a suggestion, not as an agreement.

Update on Planning of International Policy Workshop

Erin Vos, Sound Project Manager for the Marine Mammal Commission, provided a brief update on the planning for the international policy workshop scheduled for September 28-30 in London, England. She noted that a venue has been identified which limits participation to 120 individuals making it unlikely that the workshop will be open to the public. To date, 140 invitations had been sent out to individuals and organizations in 22 countries and 92 participants had accepted, including 28 Advisory Committee members. Ms. Vos reviewed the current draft agenda for the workshop that the Commission has developed jointly with its co-sponsor, the U.K. Joint Nature Conservation Committee (JNCC). She noted that there is an opportunity for anyone attending the workshop to provide a poster presentation. Expected products of the workshop include background documents, abstracts from the poster presentations, and a workshop summary report.

Update on NOAA/Navy Bahamas Stranding Report

Donna Wieting, NOAA Fisheries Office of Protected Resources, reported that a final NOAA/Navy report on the Bahamas Stranding incident had not been completed. She explained that review of the data had revealed inconsistencies that require further examination before final conclusions are drawn. New information on both auditory and non-auditory effects from the April 2004 Beaked Whale Technical Workshop and on pathology of stranded animals in the Canary Islands, coupled with concerns regarding the analyses used in developing the interim report had indicated the need for additional review. To accomplish this NOAA is planning two workshops. The first will be a technical workshop involving board-certified pathologists to conduct an independent expert review of the available data. This will be followed by a second workshop for the public to discuss the findings of the pathology workshop. It is hoped that some members of the Advisory Committee will participate in this second workshop. NOAA is hoping for a six-month timeframe, with the first workshop occurring this fall, but this is not guaranteed and it is unlikely that there will be a final written report in that timeframe.

The following comments and concerns were noted by Advisory Committee members:

- The delay in getting a final report out is problematic for this Advisory Committee as it makes it difficult for the Committee to discuss this critical incident in its report. Concerns were voiced about how the Advisory Committee will be able to address this incident and its implications. Ms. Wieting acknowledged that the Interim Report provides only the information available at the time it was prepared, and that additional information may lead to different conclusions. She reiterated the hope that the second workshop will involve members of this Advisory Committee. It was suggested that perhaps the Committee can get at least a partial report or some kind of formal presentation from NOAA on this before it ends its work. It was also suggested that in the absence of a final report, the Interim Report plus the results of the pathology workshop would inform the Committee.
- Asked if the photo-identification data for the local beaked whale populations developed by Ken Balcomb will be reflected in the revised report, Ms. Wieting indicated that it would be, as would be

the acoustic exposure modeling being done jointly by Ken Balcomb, John Hildebrand, and the Navy.

Discussion of Working Draft Report from Subcommittee on Synthesis of Current Knowledge

Lee Langstaff, Facilitator, introduced this session by reviewing the Subcommittee membership and the process for developing the current draft Subcommittee product. She noted that due to time constraints the Subcommittee members did not have opportunity to review the most recent edits to the Working Draft Report prior to its circulation, and therefore it does not represent a Subcommittee consensus at this time. She explained that the goal of this session was to capture the impressions, concerns and questions of Committee members and their recommendations for next steps for the Subcommittee. In particular the Subcommittee sought feedback on the tone, readability and appropriate level of detail and inclusiveness, as well as substantive questions or concerns.

The following is a summary of Committee comments:

- Committee members praised the work of the Subcommittee, noting the impressive amount of work that has gone into developing this draft in a short time. Committee members generally confirmed that this is an important piece of the Committee's work. It is, appropriately, not a comprehensive scientific product but a reflection of the scientific basis available for addressing the issue. It will provide needed background information for Congress and other non-technical audiences as well as a basis for recommendations from this Committee. The overall tone, organization and format were positively received as appropriate to the target audience.
- In some sections of the draft, there is a mix of policy considerations and science reflected in the report, particularly in the sections describing disagreements. The Committee agreed that the Working Draft Report should be "scrubbed" to eliminate the discussion of policy issues. Subcommittee members acknowledged the challenge of attempting to explain why a scientific point is relevant to the target audience (policy makers) without stepping into the realm of policy considerations. There was general agreement that this report should stick to the science, as policy issues will be discussed elsewhere.
- A clearer distinction needs to be made between uncertainties and disagreement, and more discussion is needed of the significance of disagreements. Disagreements should refer to situations where there are conflicting research findings or theories or differences in the interpretation of data.
- Several Committee members raised concerns about ensuring that the document has scientific credibility, and recommended that some form of external expert review process be used to address this concern – perhaps subject experts to look at different sections. However, while others agreed that additional subject area expertise should be brought to bear on some topics, they cautioned that a scientific review process of this kind of synthesis document would not be practical.
- The report must reflect the most currently available information. The Subcommittee should evaluate new and emerging sources of information and incorporate them as appropriate (e.g. the Beaked Whale Technical Workshop Report, recent reports from the International Whaling

Commission and the European Cetacean Society, ongoing analyses of the Bahamas strandings, etc.).

- The report should reflect the best and most reliable scientific knowledge. There was some discussion of the extent to which information based on non-peer reviewed science should be included, and also some discussion of what constitutes “peer-review.” Some Committee members asserted that the Subcommittee’s report should only reflect peer-reviewed science, while others argued that it would not be reasonable or acceptable to limit the report to only peer-reviewed science, especially given that the peer-review process can be slow and we want to be able to reflect the most current information. There was concern that to exclude all information that has not undergone peer review would undermine the credibility of the Committee’s work. The Subcommittee should look at and consider including more recent information, and come back to the Committee with recommendations for how to handle it. A question was raised regarding how the subcommittee “weighs” different sources of information, particularly where there is disagreement over facts.
- Some suggested a separate section or sections addressing strandings and beaked whales (including the table of “atypical” beaked whale strandings) since these are currently major issues of interest that come before the target audience for this report. Others noted that the Commission will be coming out with a full report of the April Beaked Whale Technical Workshop that could inform this effort, as could the findings of the final NOAA/Navy report of the Bahamas strandings. It was agreed that the Subcommittee should review these as they become available and incorporate the information as appropriate.
- Concerns were raised about the treatment of sound sources in the Working Draft Report. There were specific questions about the accuracy of the table of sound sources and characteristics (particularly regarding the propagation characteristics such as dimension of spatial detectability. In addition, Committee members noted that some important sound sources are not included in the discussion or the table in this section – notably sounds produced in conducting research such as Acoustic Thermometry of Ocean Climate (ATOC) and geophysical surveys. Subcommittee members acknowledged that the table needs work and invited Committee members to provide information on additional sound sources. There was also a specific suggestion to have separate tables for discrete versus ambient noise since it is misleading to compare them in the same table.
- In addition to noting the areas of scientific uncertainty, the report should delineate for the audience the practical limits of what additional knowledge or certainty is likely to be available within a reasonable amount of time, and what is likely to be essentially “unknowable” for the foreseeable future. One suggestion is to expand and strengthen the uncertainty sections by providing an assessment of the likelihood of getting the questions answered, for example noting whether the questions are 1) easily answered with additional research/funding, 2) currently under investigation, or 3) not likely to be answered in the near future even if funded, etc. This would contribute significantly to the Advisory Committee’s efforts to prioritize research recommendations.
- There was general agreement that the first paragraph of the introduction is better suited to be in the introduction to the full Committee report rather than this piece. It should be removed from here and saved for that purpose.

- The current draft is uneven - some sections more finished than others, and there is a tension between providing generalities versus details needed to inform the audience in some areas.
- The report should not be “dumbed down.” It should provide direction to readers about where they can get more information on specific topics.
- Introductory language should be revised to reflect a balance between the benefits of the use of sound in the marine environment and the potential problems associated with it. Currently the overall tone appears to understate the problem and favor the “sound is good” side of the equation.
- More discussion is needed at the Committee level about the use of extrapolation and what should be said about it in the report. There needs to be clear distinction between the extent to which there is scientific disagreement over the use of extrapolation or disagreement over the use or application of extrapolations in the policy decision making arena. The Committee should provide clarification to the target audience about the appropriate scientific use of extrapolation.
- Much more work needs to be done on the Ecosystem Effects section of the report – and this is one area where the need for outside substantive expertise has been identified. One Committee member questioned the need to include this section, suggesting it is outside the scope of the group. Others supported its inclusion, and David Cottingham pointed out that ecosystem impacts are included in the Advisory Committee’s charter as well in the Marine Mammal Protection Act.
- Additional work needs to be done on citations and references to ensure that they are accurate and complete.
- Concerns were expressed about the process for developing this Subcommittee draft product. In particular there were concerns that the process was deadline-driven, resulting in a Working Draft Report that Subcommittee members did not have an opportunity to review before it was circulated to the full Committee. This should be avoided in the future. Others acknowledged that it was an imperfect process, but that without the deadline much less would have been accomplished, and there is now the opportunity for the Subcommittee to make further revisions with the input of the full Committee.

In addition to discussion of the Subcommittee Working Draft Report, Committee members discussed the need to identify research needs. They asked that the Subcommittee take on the task of compiling the research recommendations from other efforts (*e.g.*, NRC panels and other reports), and also identify any additional recommendations based on their own work. The development of criteria for prioritizing research and the identification of recommendations for research priorities should be accomplished at the full Advisory Committee level.

Finally, the discussion of the Subcommittee’s Working Draft led to questions and comments about how it might appear as a part of the Committee’s full report. Several members noted the need to develop a vision and structure for the overall report. A small group agreed to draft a preliminary strawman outline to kick-off Committee discussion of this.

Next Steps for the Subcommittee on Synthesis of Current Knowledge

1. The Subcommittee will continue to develop and improve its report based on the input of Committee members at this meeting and any additional specific comments to be submitted in writing. Specifically they will:
 - “Scrub” the document to eliminate policy issues;
 - Determine how to integrate new information, including that which may not be fully peer-reviewed;
 - Clarify uncertainties versus disagreements; and
 - Include additional sound sources and correct the table of sound sources in the draft document.
2. Advisory Committee members will submit specific comments on, and suggested revisions to, the Working Draft Report to Erin Vos and Lee Langstaff by August 13.
 - Comments may be in the form of a redlined copy of the draft or a stand-alone summary of comments.
 - Suggested revisions should include the rationale behind it so that Subcommittee members have the information needed to consider related or conflicting comments.
 - Any new information should be supported by appropriate citations and references.
3. The Subcommittee will compile a list of research recommendations that have been identified by other efforts to inform the Advisory Committee’s development of its own recommendations.
4. The Subcommittee will meet in September and October to continue its work and to develop a revised draft for distribution and review two weeks prior to the November/December Advisory Committee plenary meeting in New Orleans.

Summary of Recent IWC Scientific Committee Meeting Discussions re Acoustic Impacts on Whales

Bob Brownell, NOAA Fisheries, was asked by several Advisory Committee members (with the agreement of the full Committee) to provide a brief summary of the relevant outcomes of the recently concluded meetings of the International Whaling Commission (IWC). The meetings were held in Sorrento, Italy. Dr. Brownell is a member of the U.S. delegation to the IWC and is a member and former chair of the IWC Scientific Committee. He explained that the IWC was established in the 1940s to address the management and conservation of large whales. Fifty-seven member nations attended this year’s meeting. The U.S. is a signatory of the IWC treaty and has historically played, and continues to play, a major role on the IWC Scientific Committee that develops recommendations for the IWC Commissioners. The IWC takes the recommendations of the Scientific Committee very seriously and considers and adopts their recommendations by consensus. Scientific recommendations of the IWC approved by the U.S. delegation typically factor into U.S. domestic policy.

A standing working group of the Scientific Committee that focuses on environmental concerns held a mini-symposium on anthropogenic sound during this year’s meeting in response to the issue being raised in previous years. After the symposium, the Scientific Committee reached consensus on several statements regarding anthropogenic noise and marine mammals. Dr. Brownell noted that it is very challenging for the Scientific Committee to reach consensus, so the consensus reached on this topic was very important and unusual. The Scientific Committee members agreed that military sonar

constitutes a threat to beaked whales, and that there is also cause for concern regarding the impacts of other sound sources, including seismic activities, on marine mammals.

Advisory Committee members commented on the presentation from Dr. Brownell in a long and contentious discussion. Among the comments brought forward were the following:

- There was discussion about the importance of the findings of the IWC Scientific Committee. Some indicated that the Advisory Committee could not ignore these and still maintain credibility. Others questioned the credibility of the IWC Scientific Committee findings themselves
- Some Committee members noted that it is unclear what new data were presented at the IWC meeting that would support the consensus statements of the Scientific Committee. Some Advisory Committee members expressed concern that the background papers presented little new information. When told that the consensus statements were based in part on background papers, they also noted that the papers presented are not peer reviewed for journal-type publication. Some participants in the IWC meeting noted that the Science Committee process itself functions as a form of peer review, given the diversity of nations and disciplines represented.
- Some sound producers questioned whether the IWC process treated them evenhandedly, and argued with specific information presented in the background papers.
- Others noted that the work of the IWC Scientific Committee should help illuminate the strong potential for non-lethal impacts of concern (such as masking effects due to ensonification of large areas), and argued that an absence of recorded mortalities from a specific source does not mean that source is not having impacts.
- Some noted the fact that the IWC is a functioning international forum with a long and respected history of extensive scientific debate, and argued that this should be convincing to Committee members of the weight of its consensus statements.
- It was noted that the conclusions of the IWC Scientific Committee are somewhat similar to those of the 2003 NRC report.
- Some argued that the IWC results indicate that the Navy must face the issue of mid-frequency sonar impacts on beaked whales and perhaps other species in a more straightforward manner.
- It was suggested that the Advisory Committee needs time to read all of the background papers and the Annex K consensus statement before it determines what the IWC proceedings mean for the Advisory Committee's effort.

Brownell explained that the U.S. delegation included 28 scientists, 12-14 of whom are NOAA employees, but they participate as individual scientists, not as representatives of NOAA. The U.S. delegation is quite large because they participate in all subcommittees. A list of the names of participating scientists is publicly available.

Public Comment

The comments of five meeting observers are briefly summarized below.

Michael Stocker, SeaFlow. Noise is being considered exclusively as a decibel level and this is not helpful in clarifying risks. Vulnerability in terms of temporary threshold shift levels, synergistic effects, etc., is very hard to deal with. With respect to mitigation and monitoring, a distinction needs to be

made between considering a marine mammal's sensitivity to sound versus considering the likelihood of a marine mammal intersecting with a given source. There is a tendency to accept current practice of using noise and trying to mitigate the effects. Instead we should be looking at mitigation from the standpoint of adjusting the source characteristics: look for quieting technologies, considering harmonic content and rise time of signals. Don't just talk about decibel levels and the thresholds (auditory and non-auditory) that marine mammals can withstand. Mr. Stocker provided additional written comments which are available on the Marine Mammal Commission website (<http://www.mmc.gov/sound>).

Ben White, Animal Welfare Institute. There are two superpowers as audiences for this Committee's work: the U.S. military and the global civil society. We need to be sure the decisions here are credible and acceptable to the latter. We want this to be a model for the development of global rules. If information like that developed by the IWC is excluded it will damage the credibility of this process.

In other pollution issues, industries sometimes decide to police themselves when evidence points to impacts. We are not seeing that here, the sound producers are not stepping-up to the issue. The fact that 75% of the marine mammal research is being supported by the U.S. Navy does not help credibility. As evidence and events continue to build up in the public view, ignoring the linkages is a losing battle on the stage of public and world perception. Increasing numbers of permit applications are being turned down. Beaked whales have died from behavioral reactions at lower levels than expected. You cannot skirt this issue. Each time linkages and evidence are ignored makes the case stronger for those who oppose you.

Bill Rossiter, Cetacean Society International. I am here because I am interested in what you can do to solve a major problem. I am disappointed today; there has been too much process and delay. Outsiders are expecting answers and solutions that do not seem to be forthcoming. You must come together and get impolite if necessary in order to come up with actions.

Bruce Mate, Oregon State University. I am not an acoustician, but I am a marine mammal researcher. Some work of mine has been cited several times as evidence of seismic sound impacts on sperm whales. This was an abstract I did for an Acoustical Society of America workshop – it described a series of observations that suggested potential problems. It was not peer reviewed, and I never pressed for peer review because I knew the data were not conclusive.

Regarding permitting, we need new information to feed discussion and address data gaps. We should give major consideration to allowing controlled exposure experiments (CEEs) to take place so we don't keep guessing. Give constructive guidelines to Congress and NOAA Fisheries with details for how to protect animals and get the answers we need. I have wanted to study some impacts for two years, but dropped the CEE aspect because it lessened the likelihood of getting a permit to do this important work. Consider the implications for research - this dynamic will prevent new researchers from entering this field. We have a lack of data and understanding of some very basic things. Research must edge towards impacting the animals in order to find out where the edge is.

Guy Oliver. Keep in mind your audience. The report must be readily accessible. Look at recent 9-11 Commission Report, which is highly readable. Set your stage with the science and then get into it. Spend enough time wordsmithing to make it compelling.

DAY TWO – Wednesday, July 28, 2004

Opening Remarks

Ms. Orenstein began the day by reviewing the outcomes from the first day as follows:

- Achieved agreement on the approach this Committee will use with respect to intersecting with the reports of the U.S. Commission on Ocean Policy and the Pew Oceans Commission.
- Provided direction to the Subcommittee on Synthesis of Current Knowledge to continue developing its report.
- Agreed that the full Committee will work as a whole to develop research priorities, reviewing a summary of recommendations from other efforts and discussing research prioritization at a future date.

Ms. Orenstein then asked Committee members if they had any additional feedback or issues with the final edits suggested for the summary of the April plenary meeting. Questions about one edit were resolved and the meeting summary accepted as final. The final version is posted on the Marine Mammal Commission website (<http://www.mmc.gov/sound>).

Ms Orenstein went on to explain that the focus of the second day's sessions would be on barriers to research, some of which have been difficult to discuss and address productively in the past. She urged Committee members to maintain a professional and respectful approach and to focus on getting key issues identified and discussing how they should be handled in the Committee's final report.

Issue 1: Scientific Research Funding. What funding is currently available to address the scientific uncertainties of concern to the Advisory Committee?

Lee Langstaff began by reminding participants that the goal of this session was to establish a common knowledge base regarding marine mammal related funding and funding processes. Prior to this meeting, a survey form was circulated to collect information to inform the Committee discussion and to reduce the need for lengthy presentations at this meeting. The survey was sent out to all Committee members and requested information on their funding programs over the last 3-5 years and anticipated in the current and coming years related to:

- research specifically on impacts of sound on marine mammals;
- baseline marine mammal research;
- research on sound source characteristics and propagation as they relate to marine mammals; and
- research on mitigation and monitoring related to impacts of sound on marine mammals.

The survey also requested a brief summary of the goals of research funding programs and a description of the solicitation, review and award processes.

A total of 13 responses to the survey were submitted (10 were compiled and provided to Committee members the week prior to this meeting and an additional three provided at the meeting). Ms.

Langstaff explained that the results of the survey were intended to provide an informal “snapshot” of the status and focus of research funding on the issues relevant to the Committee’s work, and to provide context to inform Committee discussions of research needs, barriers, and priorities. She noted that the information submitted varied significantly in terms of level of detail and format and emphasized that the results are not intended to represent, nor should they be characterized as, a comprehensive review of research funding and funding processes related to marine mammals and sound.

Ms. Langstaff proposed that the Committee consider the information from each organization in turn, with each organization having an opportunity to provide clarification or explanation of the information they submitted, followed by questions and discussion among Committee members. She suggested that following this information sharing, Committee members could discuss the key issues or points coming out of these discussions that have implications for the development of research-related recommendations that the Committee may develop. It will also be up to the Committee to determine whether or how the information collected through the survey might appear in the Committee’s report.

National Oceanographic Partnership Program (NOPP). **Jim Yoder, National Science Foundation**, presented a brief summary of NOPP (presentation slides available at <http://www.mmc.gov/sound>). He emphasized the value and importance of the partnership aspect of this research funding program, established by Congress in 1997 and designed to enable multiple federal agencies and private funders to jointly support research on issues of shared interest. He noted that NOPP might be a good mechanism to support future research recommended by this Advisory Committee. In his remarks he highlighted the following points:

- Selection and funding are done through a competitive selection process, originating in a Broad Agency Announcement (BAA). Most BAAs have come out of the Office of Naval (ONR) research (one from NOAA) because the original legislation creating NOPP gave ONR a leadership role. However, any participating agency can be the lead agency to produce a BAA.
- A peer review process is used to select awardees. The evaluation criteria are specified in the BAA, and always include a partnership component.
- The results of research funded by NOPP are submitted for peer review and publication. There is no requirement for seeking agency review prior to publication.
- A marine mammal theme was adopted two years ago, including acoustics and related topics.
- NOPP has invested \$9.3 million to fund eight projects related to marine mammals.

In response to questions, Yoder provided the following additional information and clarification:

- There is no congressional appropriation of funds specifically to NOPP. Funding must come from participating agencies. NOPP itself is not a line item on any agency’s budget. Once a project is selected, agencies work out who will fund it, or multiple agencies may fund a particular investigator. There are a number of bills pending in Congress related to streamlining multiple agency funding processes.
- NOPP does not accept unsolicited proposals.
- In response to a comment noting that NOPP funds seem targeted on topics that are highly specific, Yoder explained that the NOPP partners seek intersections of their interests in deciding what research to fund, and the scope of the marine mammal theme in the BAA has been very

broad. There is some discussion of taking into account the recommendations of the NRC reports in the future when selecting research topics.

- There is environmental NGO representation on the NOPP advisory panel that helps set priorities and on the expert review panel. In the future, NOPP may expand to include more non-federal representatives. Joel Reynolds of NRDC noted that he had been involved in a NOPP panel.

Additional comments from Committee members:

- The NOPP process is valuable and brings added dollars to this topic.
- NOPP is not a replacement for other funding, particularly funding for basic research, but it is an especially good mechanism for identifying targeted funding for applied research.
- The fact that there is no “vetting” of results by participating funders is a good safeguard for the independence of the researchers.

U.S. Navy. **Frank Stone, Office of the Chief of Naval Operations, and Mardi Hastings, Office of Naval Research,** provided a brief presentation to supplement the material submitted by the Navy in response to the survey (presentation slides available at <http://www.mmc.gov/sound>). Dr. Stone reviewed the substantive focus of Navy funded research and the sources of funding, emphasizing the following points:

- The Navy has identified marine mammal research requirements in four key areas: marine mammal demographics, criteria and thresholds of impacts from Naval activities, mitigation methodologies, and acoustic source characteristics.
- Two programs provide the majority of funding: Office of Naval Research (ONR) and the Center for Naval Operations (CNO). ONR projects begin as basic research, then move to applied research to assess the applicability of the information to Naval needs. Information and technologies that prove valuable are then funded for more advanced development. CNO projects focus on demonstration and validation of information and technologies for operational use, and incorporation of results into Naval operations and maintenance.
- Additional significant sources of research funding include congressional additions and the Department of Defense Strategic Environmental Research and Development Program (SERDP). SERDP involves pooling of funds from the Navy and all three other services (Army, Air Force, and Marine Corps), and the majority of its funds go to the other services.
- The projected research budgets for 2005 and 2006 are probably optimistic given the challenge of balancing research funding needs with resource demands for the Iraq war.

Dr. Hastings went on to review the solicitation, review and selection processes used by the Navy, highlighting the following:

- Out of \$6.1 million in ONR’s research budget, \$1.5 – 2 million go to NOPP.
- Approximately 10% of appropriated funds are for special programs in which principal investigators (PIs) compete.
- Anyone can submit a proposal, including unsolicited proposals. The process is competitive and is clearly laid out on the Navy’s ONR website. Currently there are 51 principal investigators being funded. Funded researchers are required to provide annual reports.

- No outside panels are used to evaluate proposals. Successful proposals must demonstrate potential contribution to the Navy's mission (which is interpreted broadly and does not represent a significant hurdle). They are also evaluated with regard to overall scientific or technical merit, the qualifications of the PI, and the projected costs. All proposals are subject to federal standards of confidential review requiring access to review results by the applicant.
- Publication of research results in peer-reviewed journals is encouraged, as are presentations at scientific conferences, etc. In FY2003 there were over 50 peer-reviewed publications involving research funded by ONR.
- All ONR programs undergo external expert panel review every 1-2 years. One evaluation metric is the number of peer-reviewed publications. The last review of the marine mammal program was in May of 2003 at the Environmental Consequences of Underwater Sound (ECOUS) Symposium meeting, where 12 outside experts reviewed over 100 presentations. Additional reviews of the temporary threshold shift program and 2 other programs are ongoing.

In response to questions from Committee members, Drs. Stone and Hastings provided the following additional information:

- Study of critical habitat is included through several efforts:
 - Integration of geographic information systems (GIS) parameters to show marine mammal movements and relation to environmental factors;
 - Funding of a worldwide beaked whale stranding database;
 - Marine mammal detection modeling; and
 - Passive acoustic monitoring of Navy ranges.

Basic survey work is not funded through basic research unless it involves new methodologies, and tends not to include status and health assessments such as NOAA Fisheries would do.

- Development of the beaked whale stranding database is intended to help the Navy identify beaked whale "hot spots" so that they can be avoided (which is not to say that all other areas are "safe" areas for naval operations). The data are also used for risk assessment processes. The database is global and is a work in progress. It was initially part of the Navy International Cooperative Program (NICoP) and includes stranding and sightings data gathered by Colin McLeod and Angela D'Amico. The information from the database is being integrated into the Ocean Biogeographic Information System - Spatial Ecological Analysis of Megavertebrate Populations (OBIS-SEAMAP) database managed by Dr. Andrew Read at Duke University. It will be publicly available. The database is not a definitive source of information on beaked whale distributions. Much work is needed to improve it, including habitat correlation data and better predictive models. Some work is being done to correlate information in the database with Naval activities. A paper is currently being prepared showing those correlations.
- In establishing external program review panels, the Navy seeks input from scientists for qualified experts. The Navy does not fund the panelists.
- Annual reports of PIs are publicly available.
- By law, information regarding proposals that are not funded are kept confidential by the Navy. The applicant has the reviewers' comments and is the only one with the discretion to release them.
- Compared to ONR, projects funded by the Defense Advanced Research Projects Agency (DARPA) tends to be very applied and on a quicker timeline. There is little overlap in research focus. Some ONR-funded PIs also receive DARPA funds.

- The only way the Navy is involved in any review of research results is through the annual reports required of PIs. There is no Navy “vetting” of research results or publications. There is regular communication with PIs, especially in the more applied research projects, often with an effort to link those working on related issues, fostering communication and cooperation.
- There is no formal requirement that researchers who receive Navy funding not oppose Navy policies or activities. While there may be a perception among some that bias along such lines exists, representatives of the Navy stated their belief that it is not based in fact. ONR funds broad areas of research on many issues besides marine mammals, and the criticism that ONR is a “good old boys” network is not unique to the Navy. There are similar perceptions of other funders as well.

Additional comments and discussion points of Committee members:

- The Navy should be applauded for its remarkable contribution to our knowledge of the oceans.
- Several Committee members emphasized that it would be very useful if data from various sources, such as tagging studies and monitoring data from mitigation efforts for seismic, naval, and many other activities, could be included in OBIS-SEAMAP. Much potentially valuable information is being collected and should be put somewhere where it can contribute to advancing our understanding. Others noted concerns that monitoring and observation data are collected using different techniques, protocols and formats, making it difficult to combine or put into a single database without potentially serious quality control problems. It was suggested that standards and protocols for collecting monitoring data in a statistically valuable way be developed so that the data can be used. This issue was identified as one that should be taken up by the Mitigation and Management Subcommittee.

Oil and Gas Industry. ***Jim Ray, Shell Global Solutions (U.S.) Inc.***, explained that the oil and gas industry has not yet gathered the information needed to respond to the research funding survey. Before requesting information from the many players in this sector, they would like to get a better understanding of what information would be most useful and in what format. He provided a general overview of industry funding activities, highlighting the following:

- The oil and gas industry approach to research is not cohesive, but is made up of many disparate approaches due to the fact that it involves hundreds of individual companies. However, they are almost always driven by the need to fill data gaps in order to respond to regulatory agency requirements. These range from basic biology to sound source characterization.
- Some examples of major efforts, totaling some \$26-27 million include:
 - Approximately \$15 million over 20 years spent by the industry on bowhead whale research in the Beaufort Sea
 - \$10 million spent to date on western gray whales in the Sakhalin Islands
 - \$1.5 million industry contribution to cooperative research with the Minerals Management Service (MMS) and ONR on sperm whales around platforms in the Gulf of Mexico, including monitoring, tagging, oceanography and source characterization (known as the Sperm Whale Seismic Study program, or SWSS). This is likely to continue for several more years.

- Other research programs involve various industry associations such as the United Kingdom Offshore Operators Association, which is coordinating studies through the JNCC and Cornell University on monitoring of fin and humpback whales using passive acoustics. Other joint efforts involve the Australian Production and Exploration Association (ASPEA) and more recently the Canadian Association of Petroleum Producers (CAPP).
- The industry generally relies on outside biologists and consultants to do this work.

In response to questions from other Committee members about the research funding activities of the oil and gas industry, the following additional information was provided:

- The industry does not have any “umbrella” organizational mechanism for research across companies. Any coordination that is done is likely to be around a geographic region or specific species. There is some discussion going on now about the need for a broader and more coordinated approach that could address marine mammal issues on a more global basis. Recommendations from this Committee might help to encourage such an effort.
- The ways in which the results of industry-funded research are managed also varies from company to company. Generically speaking, a technical oversight group (of 10-15 scientists) would be set up by a company, and they develop a request for proposals and select a contractor. They will usually also review the work throughout the project, since many projects are closely associated with industry operations. The oversight group usually provides internal review of results before they are released externally. Research contracts often require the publication of results in peer-reviewed journals, to ensure high quality work. However, much of the industry data, particularly monitoring data, is not of interest to peer reviewed journals.
- Transparency issues have emerged in recent years, and different companies or oversight groups may handle them differently. The general trend is to make the raw data available at the end of a project so that anyone can see if the conclusions are supported by the data. Due to time sensitivities in many projects, data may need to be used prior to formal peer review and publication. This can make it difficult for a PI to publish in journals that prohibit the release of data prior to publication.

Minerals Management Service. **Bob LaBelle, Minerals Management Service Offshore Minerals Management**, provided a brief explanation of information from the survey regarding MMS’s research program.

- The MMS-funded research on marine mammals is done through their Environmental Studies Program, which is mandated by the Outer Continental Shelf Lands Act. Much of this is comprised of environmental assessments related to offshore oil and gas activities, totaling approximately \$17 million per year.
- Support of marine mammal research goes back to 1980s and includes research to answer basic and meaningful questions.
- There is internal competition for funds within the agency, and marine mammal research competes for funding with other agency research needs, including studies of air quality, socioeconomic issues, biological issues, etc.
- Independent scientific committees of outside experts review plans for studies.

- There have been several program reviews by the National Academy of Science and a recent highly rated evaluation of the research program by the Office of Management and Budget.
- MMS had funded work on a continuing basis on many things like bowhead aerial surveys (since 1989) and sees a continuing need for marine mammal monitoring and research.
- A correction needs to be made to the table submitted by MMS. On page 9 the amount for SWSS should be \$6,000K.

In response to questions, LaBelle noted that:

- It is a fair characterization that MMS research is mission-specific, not pure basic research. However, much of the early work involved basic baseline studies.
- MMS contributes to NOPP, for the Ocean Exploration Initiative looking at submerged wrecks from World War II. This has amounted to somewhere in the vicinity of \$100,000 over the last couple of years.

National Marine Fisheries Service (NOAA Fisheries). Committee members had several questions and comments regarding NOAA Fisheries research funding, many based on concerns over why the NOAA Fisheries information submitted in response to the research funding survey was so limited in scope (for headquarters it provided only information related to the Acoustics Program, and information for only one regional office (Southeast) was submitted). There was concern that there are missing elements that should be included, such as NOAA's role as a partner in the Sperm Whale Seismic Study (SWSS) program – numbers that would dwarf the \$200K to fund the Acoustics Program. Donna Wieting responded by providing the following explanation and additional information:

- NOAA Fisheries felt it was appropriate to focus on the Acoustics Program funding since this is focus of the Committee's efforts. They did not ask the regional offices for funding information regarding research associated with things like stock assessments because the budget is changing and it very difficult to break out what funds actually go to the topics of interest to the Committee.
- Overall, NOAA Fisheries receives approximately \$7 million for work on MMPA-related and \$3 million for Endangered Species Act (ESA)- related work. These funds are largely used for statutorily required efforts. For instance, MMPA funds are used for stock assessments, abundance estimates, mortality estimates, and Take Reduction Teams, most of which is used for fisheries-related work. The budget is not broken down into a level of detail that lends itself to this sort of survey.
- The budget also includes line items for specific projects, such as Steller sea lions or monk seals, again with a primary focus on fisheries issues.
- With regard to specific requests for funds to work on the acoustics issue, the Office of Protected Resources has laid out its ideal program needs, which are essentially the research priorities identified by the Noise Exposure Criteria panel. This must compete with other agency priorities for funding.

Additional comments and questions from Committee members included:

- One Committee member noted that a more detailed and inclusive overview of the NOAA/ NOAA Fisheries researching funding would be helpful. It is clear that very little money for marine mammal research comes from NOAA Fisheries even though, given its regulatory responsibilities, it should be doing much more of this. This Committee needs more information from NOAA Fisheries in order to make well-informed recommendations regarding the need to

provide adequate funding to the agency to do its job. In particular, information about funding of activities related to stock assessments and ESA recovery activities related to marine mammals would be helpful.

- The Committee's report should address the confusing arena of appropriations and budgeting for NOAA. Politically attractive issues get specific funding from Congress, while there is inadequate attention to the agency's other needs. Congress seems to think that the Defense Department has this topic "covered," but this is not enough.
- One Committee member noted that stock assessments focus on overall populations, creating a mismatch of scale with respect to areas of concern regarding the sound issue. Ms. Wieting acknowledged that the agency is aware of this mismatch and is working to identify what useful information it can provide with current funding while assessing what more is needed to get more advanced levels of detail for more useful spatial and temporal scales in stock assessments, with the goal of making them more useful for ecosystem management needs (including those related to this issue). Another member noted that the stock assessments are not considered research, but are basic information for agency operations and mission requirements.
- This is an area where the Committee can look for overlap with U.S. Commission on Ocean Policy recommendations, particularly 20-7 and 20-8.
- In response to a question about the process for deciding priorities in spending Acoustic Program money, Ms. Wieting explained that there is no formal granting process. Decisions are based on immediate needs and typically sole source contracts are let.

U.S. Fish and Wildlife Service (USFWS). **Marty Kodis, USFWS**, provided brief remarks on the research funding information submitted by the USFWS, noting that it was exclusively related to work on manatees, for which USFWS provides funds to outside sources. The USFWS also receives MMPA funds on the order of a \$2.4 million per year in a general program operations line item. In FY 2004 Congress added a \$1 million earmark to develop and test new survey techniques in Alaska that will also improve baseline information. The agency also expends Endangered Species funds on manatees in Florida and sea otters in California.

Environmental NGOs. Three environmental groups submitted responses to the research funding survey: International Fund for Animal Welfare (IFAW), The Humane Society of the U.S. (HSUS) and the Whale and Dolphin Conservation Society (WDCS).

- **Erin Heskett, IFAW**, explained that the organization has two arms of research: an internal whale research team and a program soliciting external PIs internationally. For the latter he added that there is an internal review process to select research that supports IFAW objectives. A key criterion is that the research has the potential to contribute to the protection of marine mammals. Annual reports are required of IFAW-funded researchers and publication in peer-reviewed journals is encouraged. He noted that funding for work related to acoustic deterrent devices (AHDs) has amounted to \$14,000. **Peter Tyack, Woods Hole Oceanographic Institution**, noted that as a PI the research funding process for IFAW and ONR or NSF feel comparable. The selection of the topic and linkage to the organization's mission is the only substantive interaction.
- **Sarah Dolman, WDCS**, explained that WDCS does not have a process for soliciting proposals, but an internal board reviews proposals seeking appropriate expertise and compatibility with the WDCS mission. They then do an external review. Annual reports are required but nothing more. The work often results in publication.

- **Naomi Rose, HSUS**, explained that HSUS does not have any research funding program and does not solicit proposals. Occasionally they will provide very small amounts of funding in response to an unsolicited proposal or will offer funding for research that addresses their mission. In either case there is no requirement for HSUS review.
- One Committee member highlighted the fact that the information submitted by these three organizations does not represent all relevant environmental NGO research funding. There are other organizations for which research funding is a larger part of their mission, such as the World Wildlife Fund and the Wildlife Conservation Society.

It was pointed out by one Committee member that none of the research funding described in the responses to the survey appears to be focused on development of quieting technologies.

In concluding this session, it was noted that oil and gas representatives would work on collecting and compiling information on industry research funding, preferably in a form similar to the summary table submitted by the Navy. In addition, more information was requested from NOAA Fisheries as discussed above. Ms. Langstaff wrapped up the session by reminding Committee members to think about how best to use or reflect the information gathered regarding research funding as the Committee moves forward in the development of recommendations.

Issue 2: Addressing Actual or Perceived Bias When There Are Major or Dominant Funding Sources for Research

Suzanne Orenstein introduced this session with a note that this topic has been very divisive in the past, and that there was serious disagreement about whether and how to cover it in this meeting. She encouraged the Committee to examine together whether the issue does present barriers to going forward with specific research recommendations as it conducts its discussion. Ms. Orenstein summarized the results of a conference call among Committee members that was held on July 9 to determine how to address this issue in this meeting. The conference call was intended to resolve strong disagreements about this proposed agenda item, specifically concerning whether or not to have a presenter from the medical ethics field as part of the session. The conference call involved fourteen Committee members and alternates who agreed during the call to make a proposal to the Committee for a subcommittee to develop a “white paper” on the topic for discussion during the Advisory Committee’s fourth plenary meeting in November. The proposed white paper would examine the existing standards and guidelines to address issues of bias or perceived bias, including those from government and academic entities, and the mechanisms that exist or could be developed to promote diversity of funding sources and independence of researchers from funding sources.

Advisory Committee members responded to the proposal for a Subcommittee on this issue with the following comments:

- One member suggested that the question of what we would be asking Congress to do on this topic should guide our decisions about how much time to invest in exploring the topic.
- One member pointed out that Congress is already considering legislation to expand on the National Ocean Partnership Program (NOPP) to begin addressing the issues of diversity of funding for research.

- Some felt that there are already mechanisms in place to deal with conflict of interest, and the Advisory Committee should not reinvent the wheel or overreach on the solutions.
- There were several commenters who addressed the issue of whether bias does or does not occur in research regarding marine mammals and sound. Some felt there was no bias, and asked for evidence of it; others felt it was impossible to eliminate the influence of a major funding source on researchers and their work.
- Concern was expressed that a new subcommittee would absorb Committee resources that may be better used on other issues.
- Other members felt that the question of research integrity and conflict of interest was of fundamental concern to the Committee, given the perceptions of bias already noted and the need for support for research results from all stakeholders.
- Some felt that a better use of the Committee's time would be to discuss how to structure a credible and balanced research program to address marine mammal and sound issues.
- Several academic researchers who are members of the Advisory Committee members had previously agreed that improving the diversity of funding for research is beneficial and could be an important goal for the Committee recommendations.
- It was suggested that the Committee does not have to go into great detail on this issue in its report to Congress, but could mention it and link to other recommendations for diversity of funding from the NRC and U.S. Commission on Ocean Policy reports.
- It was suggested that funding agencies should want to work on this in order to make research more credible to the public.
- Some members felt that the Advisory Committee could use this discussion as an opportunity to set some guidelines or principles to address potential or real bias, including issues of transparency of data, open funding processes and findings, peer review, etc.
- Some members pointed out that it is not appropriate or realistic for private companies to have their research funding subject to review by public entities and groups. It was noted that potential guidelines or mechanisms suggested by the Advisory Committee would be most applicable to publicly funded research.

After extensive debate, a small group agreed to develop a proposal for a Working Group of the Committee to:

- Examine the existing standards and guidelines to address issues of bias or perceived bias, including those from government and academic entities;
- Review the mechanisms that exist or could be developed to promote diversity of funding sources and independence of researchers from funding sources;
- Discuss and propose a workable and credible structure for a research program on marine mammals and anthropogenic sound; and
- Develop a proposal for how the topic of integrity and balance in research should be addressed in the Committee's report.

A decision regarding whether or how the Committee's report might address this topic will be deferred until the Committee has had a chance to review the product of this Working Group.

The working group was named the Working Group on Integrity and Balance in Research. The Working Group membership consists of: Mardi Hastings, Rodger Melton, Dick Pittenger, Nina Young, Michael Jasny, Penny Dalton, and David Cottingham.

After some discussion about whether this Working Group should develop recommendations about research priorities, it was determined that this task will be divided into two segments. The first task is to develop a summary of all recommendations made by the NRC panels on marine mammals and sound, by the U.S. Commission on Ocean Policy, and by the Pew Oceans Commission. The Subcommittee on the Synthesis of Current Knowledge will undertake this task, adding any additional recommendations that they think are desirable. The second task, to prioritize the research recommendations, will be discussed and decided upon by the Advisory Committee as a whole.

All Committee members were asked to send information about existing standards or mechanisms to address diversity of funding sources, bias and balance and credibility in research to Erin Vos and Suzanne Orenstein as soon as possible after the meeting. Suzanne Orenstein will schedule a conference call among the members to get started on the working group tasks.

Issue 3: Permitting Issues for Researchers

Ms. Langstaff introduced this session by reminding Committee members that the intention was to discuss research barriers associated with both marine mammal research permits (MMRPs) and incidental harassment authorizations (IHAs). The purpose of the session was to identify the ways in which these permitting processes may hinder needed research and to consider options for improvement that might lead to recommendations in the Committee's report.

Committee members brainstormed a list of barriers to research that relate to permitting. These are summarized here. This list reflects various concerns voiced by Committee members, but does not reflect a consensus view.

- There are severely inadequate resources at the regulatory agencies (USFWS and NOAA Fisheries) for permitting. There is inadequate staff (particularly at NOAA Fisheries) to support the process so that it can be administered in a timely way. Because the program is grossly under funded, interactions between agency staff and permit or authorization applicants are limited. Often an agency does not have adequate information (*e.g.*, animal distributions, etc.) on which to base permit decisions.
- In the absence of needed information from an agency (as above), the typical response by an applicant is to spend time and money to collect every remotely relevant fact and create huge, unwieldy documents that still do not answer the application questions.
- The costs and level of effort involved for the applicant getting a permit can be huge, and in the case of IHAs, involves non-marine mammal scientists who do not have the needed expertise and therefore require getting outside expertise to assist in completing the application.
- The process is so burdensome and resource intensive that young scientists are discouraged from working on research topics that need attention.
- Fear of lawsuits on the part of the agencies has led to the application of extra precaution in permitting and taken attention away from other efforts that would be more constructive.
- IHAs are only good for one year, creating extra work, cost and time expenditures for multi-year research efforts.
- Permitting requirements preclude potentially valuable opportunistic research.

- Case-by-case permitting is inefficient and inappropriate for research that is standard and repeated.
- Research plans are sometimes adjusted to increase the likelihood of receiving a permit or authorization (*e.g.*, if the applicant perceives that a permit would not be granted), and important work ends up not being done.
- There is a lack of understanding of the process requirements and relevant statutes among permit applicants, including options that could make the process easier. Sometimes there are overlapping standards or differing requirements (Endangered Species Act, or ESA; National Environmental Protection Act, or NEPA; and others). An applicant has to be an expert on all the statutes to successfully negotiate the process.
- “Small numbers” requirements in Letters of Authorization (LOAs) are inappropriate for long-term studies. The same standard for “small numbers” applies to authorizations for both 1 year and multiple years.
- Even if you have a permit, you are not necessarily protected from prosecution if you have an accidental take (mortality).
- The use of the term “take” is problematic. It is not universally understood that a “taking” is not necessarily a killing. This is particularly problematic in the international realm.
- Through the permitting processes, researchers are held to much higher standards than many of the activities that produce the sound whose effects we want to understand. A classic example is with fishing gear where a researcher has to get a permit to do research on the effects of the gear, but the user of the gear is not required to have a permit. This is very discouraging to researchers.

Committee members requested to hear brief presentations from NOAA Fisheries and the FWS before discussing potential solutions to address their concerns.

Steve Leathery, NOAA Fisheries, explained that a recent reorganization of the permitting office has resulted in IHAs and MMRPs being handled in the same division. Mr. Leathery reviewed the MMRP process (see presentation slides at <http://www.mmc.gov/sound>). He highlighted the following issues in his presentation and in the subsequent discussion with Committee members:

- Because of the increasing numbers of lawsuits, NOAA Fisheries has become more rigorous with regard to checking applications for complete information for NEPA review and this has tended to increase the amount of time it takes to get a complete application into the system. NEPA and ESA reviews are required for acoustics-related activities because of the level of public controversy.
- NOAA Fisheries permitting faces serious challenges due to limited resources in terms of both staff and funds, especially for preparation of IHAs due to increasing numbers of applications.
- NEPA and ESA reviews are increasingly complex and expensive, as there is greater interest in looking at cumulative and synergistic effects.
- NOAA Fisheries is working on solutions, including new hiring for permitting and securing additional funds for contracts to develop programmatic Environmental Impact Statements (EISs) for NEPA analyses. NOAA Fisheries has not yet completed a programmatic EIS for permitting.
- In addition, NOAA Fisheries is trying to work more closely with applicants to use an online application system that offers various kinds of permits and makes needed information available to the applicant.

- The total NOAA Fisheries budget for permitting now is \$800-900,000 per year. Efforts to develop solutions to some of the problems identified here require reassigning staff from permit reviews, making it even more difficult to overcome the backlog and effectively use limited resources.

Marty Kodis, U.S. Fish and Wildlife Service, explained that marine mammal-related permits amount to 10-15 out of a total of some 500 permits issued by USFWS each year. All USFWS permitting is done in the Division of Management Authority. Most MMPA permits are still done under a categorical exclusion. USFWS has never issued an IHA. The main complaints received relate to delays in processing permit applications, which are reviewed on a first-come-first-served basis. Incomplete applications are a chronic problem that contributes to delays and USFWS encourages applicants to be as complete as possible with their applications in order to avoid this.

The Advisory Committee members went on to brainstorm options for addressing permitting-related barriers to research. The following ideas were suggested by individual Committee members:

- Recommend that Congress provide funds to produce more programmatic EISs. The risk in this is that there may be less attention to some issues in specific permits.
- Seek ways to bundle permits together by related types or regions of activity.
- Establish clear standards for *de minimus* requirements when any activity needs a permit. This would not an easy task because of issues such as defining “biological significance” in applying the legal definition of harassment.
- Stop viewing public controversy as something to avoid or ignore, and use public involvement to address critical concerns.
- Recommend that Congress provide additional resources and funding to expedite permitting in the agencies, including additional staff and resources needed to begin streamlining the processes.
- Work to identify specific areas where additional funding should be provided.
- Allow IHA authorizations for several years instead of limiting them to one. This would enable (or could require) consideration of cumulative impacts.
- Seek mechanisms to link the timing of permitting to research scheduling and funding decision-making.
- Seek mechanisms to reduce the costs of permitting and compliance for applicants.
- Focus regulatory and permitting efforts on the most significant problems (refer to U.S. Commission on Ocean Policy, Section 20).
- Create incentives for permit applicants to reduce their potential impacts (including through source-based mitigation) so that the need for permitting may be reduced.
- Ensure that changes to permitting processes do not lead to lower levels of protection.

A proposal to form a Working Group on research permitting issues was approved by Committee members. The Group will examine potential improvements to the permitting processes for marine mammal research permits and incidental harassment authorizations, and will develop draft recommendations for consideration by the full Committee at the next plenary meeting. The Group will include Nina Young (chair), Steve Leathery (in coordination with Charlie Chandler of USFWS), Penny Dalton, Mike Reeve, Sara Wan, Bob LaBelle, David Cottingham and Peter Worchester.

Public Comment

Bill Lynn, Practical Ethics. This is an opportunity to understand how indispensable ethics and science are to each other. Science is not value-free. Science is built around core values of trust (credibility) and truth (scientific integrity). Today was a lost opportunity for a win/win – to engage in a discussion about how to protect researchers and satisfy public concerns. Science is value-laden, and this has consequences for specific issues like controlled exposure experiments and for policy. It is important to see how ethics can help get better science. If you build ethics criteria into the research design stage up front you can avoid the controversy and damage to animals and researchers. There are limitations to the IACUC system. There is no standard review and it is better suited for lab animals than for wildlife.

Sound science is never enough. Science can only take us so far. If empirically rigorous it produces facts. But science does not translate easily into policy. When dealing with environmental and animal welfare issues there are deep-seated values involved. In most cases of controversy it is about moral, not scientific, confusion in the public arena.

Dr. Lynn provided additional written comments that include recommended reading and are posted on the Commission website.

Rona Weintraub, SeaFlow. This is an auspicious group. I am not a scientist; I am better characterized as “Joan Public” who cares a lot about marine mammals. I want to provide a dose of public perception. It is hard to hear about more science, peer review, committees and subcommittees, but not about the animals. How in touch is this Committee with what you’re working on? We live on a water planet and we need healthy oceans. Leon Panetta, who worked on the Pew Oceans Commission has said that the oceans are dying. Dr. Robert Abbott talks about acoustic trauma to fish and fish kills resulting from blast trauma during bridge construction. In response, builders changed their technologies to reduce the impacts on the fish. I have great respect for the U.S. Navy and the oil industry, but why not make a huge attempt to have the least possible impact? Look at a comparison to medicine. What if a doctor said we’ll wait and see how sick you get, maybe until you die, to see what or how big the problem is? Instead the doctor actually tries all kinds of things in an attempt to minimize how sick you are, even in the absence of complete studies and all of the ideal data.

We all know sound affects us, how irritated we get when we have to listen to too much noise in a restaurant and we can’t hear each other talk. It changes our behavior and affects our lives even if it is not lethal. When your children, grandchildren and great-grandchildren ask you where the whales and dolphins are, what will you say? That we were waiting for more science?

Ben White, Animal Welfare Institute. I have been involved in this issue for 20 years and was told early on not to get emotional or passionate. The most eloquent comment I have heard was from a little girl at public hearing on low-frequency active sonar in San Diego who said only, “ Please don’t kill the whales.”

You have been convened because there is a public relations problem. Will your product solve that problem? If not the issue will go nowhere. In your minds, what is an acceptable consequence of introducing sound in the marine environment in terms of mortality rates? Five or ten percent? Or injury rates of 95 percent? Sounds more like acceptable weapons than protection. The approach seems to be to see how close you can cut to the bone without killing the patient. The threshold is set so high for damage that it is crazy. IHA applications are supposed to guarantee no harm or death, but NOAA Fisheries can’t seem to deny permits. For examples of bias, just look at the last 10 years. The

exposure limits have gone from 120 to 180 dB. This is an example of NOAA Fisheries and Navy working together. What good is all the research we are doing if we can't use it to be more protective? Why is the Navy still conducting exercises off the Canary Islands? The Navy says it is protecting us, but I don't feel protected by instruments that kill the sea.

Michael Stocker, SeaFlow. I have been involved in this topic since the Acoustic Thermometry of Ocean Climate study. SeaFlow is a volunteer organization and I am participating at my own expense. Acoustics is my field. Concern for the environment drives my participation. Both the Pew Oceans Commission and the U.S. Commission on Ocean Policy raise serious concerns about the health of the oceans being in peril. Both encourage the development of solutions. The U.S. Commission on Ocean Policy includes representatives from the oil and gas industry (as well as others from different perspectives) who have not published in peer-reviewed journals. Still, when this group says the oceans are in trouble, you know it is true. I have high respect for the Committee members here but am concerned about what I am hearing strategically. I see finger-pointing designed to distract the process (pointing at fisheries as a bigger problem), and talk about "junk science" when findings are unfriendly to a particular interest. The Navy is funding risk assessment, mostly for beaked whales. Is this biased? There is lots of other biota in the oceans that deserve attention.

I am interested in science-based mitigation. Let's explore technology for much quieter systems. Don't focus on research about tolerance levels, but look at ways to use technology to reduce sound levels. As a taxpayer I want to know what I am getting for my money. What am I going to get from this group?

DAY THREE – Thursday, July 29, 2004

Suzanne Orenstein began by reviewing the outcomes from the previous day and proposing a revised agenda for the third day. The Committee agreed on a priority order in which to proceed on topics the Committee wishes to discuss at this meeting.

Outcomes from Second Day

- Discussed emerging potential recommendations for:
 - Funding and staff resources for management agencies, and
 - Improvements and enhancements to research permitting processes
- Tasked the Subcommittee on Synthesis of Current Knowledge with preparing a comprehensive list of scientific research recommendations based on previous efforts (NRC, Beaked Whale Technical Workshop, NOAA Fisheries Noise Exposure Criteria Panel, etc.) and Subcommittee's own work.
- Requested additional information regarding research funding from the oil and gas industry and NOAA Fisheries.
- Established a Working Group on Integrity and Balance of Research to develop a proposal for the Committee to consider on how this topic should be addressed in the Committee's report.
- Finalized and approved the summary for the April 2004 Advisory Committee meeting (Meeting Two).
- Distributed a preliminary strawman draft outline of the final report for discussion (see Attachment B).

Proposed Order for Day Three Agenda

Ms. Orenstein turned to the plan for the day with proposed changes to the agenda to accommodate the topics the Committee members have indicated they wish to address.

1. Update on estimated exposure levels in Bahamas stranding event
2. Update from Navy on Hawaii melon-headed whale stranding event
3. Issue 5: Animal Welfare and Ethics Concerns
4. Report on NOAA Shipping Symposium
5. Update from Management and Mitigation Subcommittee
6. Discussion of straw man outline of Committee report
7. Preliminary discussion of prioritizing research recommendations
8. Planning for Meeting 4

Ms. Orenstein noted that the group would be unlikely to have sufficient time to discuss two issues that were originally on the agenda: Coordination of Research Efforts and Dissemination of Research Results, and Capacity of the Research Community. Committee members noted that these issues could be discussed at a later date, perhaps in conjunction with the work emerging from one of the newly established working groups considering research programs. There was agreement to proceed with the proposed order.

Update on Efforts to Estimate Exposure Levels in Bahamas Strandings.

John Hildebrand began by noting that we continue to discuss the 2000 Bahamas stranding event because it is the best-documented example of sound-related stranding, and has the benefit of available data to help understand the dynamics of the event. He applauded the Advisory Committee process for bringing himself, Ken Balcomb, Bob Gisiner, David Fromm, and Peter Tyack together to share their information and expertise.

The group used Navy modeling capabilities to incorporate the Navy's data on the movements and sonar activity of the two Navy ships involved in the exercise in the area, Ken Balcomb's data on relative abundance and likely distribution of 2 species of beaked whales in the same area, Peter Tyack's preliminary data on beaked whale diving behavior, and acoustic propagation metrics in an effort to model the likely sound exposure levels experienced by the beaked whales in the Bahamas incident. The modeling provided a picture of sound profiles over a 24-hour period and over the upper 50 meters of the water column. (presentation slides, including maps and diagrams, can be found at <http://www.mmc.gov/sound/>). Dr. Hildebrand noted the following:

- Sound exposure levels over 180 dB probably only occurred for tens of seconds along a very narrow track immediately around the ships, where the animals were very unlikely to be. Exposure levels between 150-165 dB (at 15 meters depth) were predicted to occur in a broader area and last up to 500 seconds.
- Information from the Navy was used to show that ambient sound levels increased to the 120-140dB range from multiple pings during the time that the ships were using their sonars. Odontocete temporary threshold shift (TTS) studies suggest that a 100 second exposure to 160 dB would not trigger TTS, although TTS has not been directly studied in beaked whales. It therefore seems unlikely that the exposure levels in this case would have caused TTS.

Bob Gisinier described the use of a dynamic 4-dimensional model that allowed the Navy to approximate animal behaviors at multiple depths and thus predict exposures to animals moving through the sound field. Each hypothetical “animat” can be tracked, and its exposure history measured. Different model variables, such as reverberation, can be changed, and movement and distribution patterns can be adjusted to look at many different scenarios. At the very least, this modeling can bound cumulative exposures even if it can’t give us exact exposures. Additional information to help us understand the behavior of the animals during exposure would be very helpful. Ultimately the models can be used to look at other events, if adequate input data are available.

Discussion points:

- One member noted the need to be cautious about extrapolating from one species (e.g. Tursiops) to another (e.g. Mesoplodon) with regard to assumptions about TTS-triggering sound levels. While we are using the best data we have and it is probably okay to extrapolate, we need to remember that it may not be accurate for these particular species of beaked whales. We need an audiogram for beaked whales to get good input and to ensure good output from these models. Another Committee member responded by agreeing with this caution, and noting the need to apply a consistent standard in this regard. It was suggested that we should not accept extrapolation when it leads to less protective standards and reject it when it might lead to more restrictive protections.
- There are some good data on estimated numbers of beaked whales before and after the event, but no structured survey has been done that could provide concrete estimates of population-level effects. It would be very useful to conduct such a survey.
- It was not possible to predict exposure levels for minke whales involved in this stranding, due to a lack of data on their numbers or location in the area.
- The limits of this work are that we have no way of knowing the specific location relative to the sound fields of the individuals that actually stranded, and therefore no way of assessing whether there was anything unique about their interaction that caused certain animals to strand while others did not.
- This effort to integrate and model species data and sound source data will be considered in the development of the NOAA/Navy report on the Bahamas stranding event.

Committee members expressed their gratitude to this group for their collaboration, and expressed support for them to continue work on and improve their results.

Navy Update on Hawaii Stranding of Melon-Headed Whales

Admiral Steve Tomaszewski provided a brief overview of current understanding of the stranding incident involving melon-headed whales in Hawaii that was concurrent with nearby naval activities. He made the following points:

- Since the Bahamas stranding incident four years ago, the U.S. Navy has put into practice many mitigation activities that were applied during its recent Hawaii exercises. Monitoring and surveillance in this case provided no indication of marine mammals in the area of this exercise (the Pacific Missile Range Facility (PMRF)), where operations have taken place many times. It is standard procedure for U.S. ships to conduct at least 2 minutes of passive acoustic monitoring

before deploying sonar, and the ships did so in this situation. (Presentation slides are available at <http://www.mmc.gov/sound>).

- The exercise included four U.S. and two Japanese ships. All ships were using 53C sonars.
- RAdm. Tomaszewski presented the following chronology:
 - On 2 July 2004 at 10:15 AM, the first shipboard active sonar was used, southeast of Kauai. Sonar was activated intermittently to prepare for training exercises up until midnight on the 2nd.
 - On July 3, the melon-headed whales were observed in Hanalei Bay at 5:30 AM local time.
 - From 6:45 to 7:15 AM on July 3, the two Japanese ships began to tune their sonar in a location 25 miles north, northwest of Hanalei Bay.
 - At 16:45, the Navy shut down all sonar in the exercise after receiving a call from NOAA Fisheries about the whales in Hanalei Bay. The closest ship was 25 nautical miles away at that time.
 - The operations resumed on July 6, after the areas was determined to be clear of whales.
- The whales were initially sighted in Hanalei Bay before the deployment of Navy sonars on the morning of July 3rd.
- The stranding occurred on the opposite side of the island from where the Navy ships were on July 2, but on the same side of where they were on July 3. If you calculated received level in that location it would probably be below 80dB.
- Based on the distance of Hanalei Bay from the sonar source, the Navy has concluded that sonar was not responsible for the whales entering the bay.

Donna Wieting explained NOAA Fisheries involvement in this incident, including the agency's on-site response to the stranding and its contact with the Navy to alert them to the problem. NOAA Fisheries will continue to collect as much information as possible to make a good assessment of the potential causes of this event. It takes time to collect the information and consider the full range of potential causal factors.

The following points were made in the discussion that followed RAdm. Tomaszewski's presentation.

- This incident is clearly more complex than has been previously explained and there is a lot of information to consider.
- There is no formal investigation by the Navy specifically into the relationship between Navy activities and this event. This would only take place if a law were broken and a legal proceeding initiated.
- We should be able and willing to consider all possible explanations without being perceived as laying blame in any one place. None of the information presented clearly rules out the naval exercises as a cause of this event. It is within the realm of possibility that the animals traveled 25 to 60 miles to seek the sound shadow of the island in response to earlier sonar testing the day before the event. Moreover, it is not clear, given some other reports, exactly when on the morning of July 3 the animals came into the bay. This could be an example of a sub-lethal behavioral response that may have been occurring for years with no obvious significant impacts. As little as ten years ago, neither the Navy nor the public would have considered a stranding like this to be connected to sonar use – we should now consider such possible connections and recognize that they may have existed for some time. We should at least try to learn by considering

scenarios like this. The information the Navy has provided here is extremely helpful and can help us explore a wider range of possible scenarios.

- Many different things can cause a stranding event and it is important to remember that it is impossible to prove a null hypothesis.
- It is good to see that the Navy acted quickly to shut down the sonar, which is exactly the correct mitigation response.

A Committee member asked if any information is available from the Navy regarding the multi-lateral NATO exercises that were concurrent with the recent Canary Islands stranding incident. RAdm. Tomaszewski responded that he was not involved in that exercise, but would seek any information that might be available.

Committee members thanked RAdm. Tomaszewski for his efforts to provide detailed information about relevant naval activities in Hawaii.

Issue 5: Animal Welfare Ethics Concerns re: Research Practices and Stranding Responses

This session began with a presentation by *Daryl Boness, Smithsonian Institution (Emeritus) and member of the Marine Mammal Commission Committee of Scientific Advisors*, that provided background on the current regulatory standards and procedures for addressing animal welfare ethics in research. Dr. Boness provided an overview of the current regulatory requirements under the Health Research Extension Act administered by the Public Health Service, and the Animal Welfare Act (APHIS) implemented by the United States Department of Agriculture (USDA). (Presentation slides can be viewed at <http://www.mmc.gov/sound/>.)

Dr. Boness outlined the program elements that are currently mandated. Institutions conducting research on live animals must have:

- A functioning Institutional Animal Care and Use Committee (IACUC)
- Procedures for self-monitoring
- A veterinary care program
- Training programs for personnel
- Environment, housing, and management programs
- Appropriately maintained facilities

He noted from his experience with the IACUC at the National Zoo that the requirements are taken seriously, especially given that federal funds can be withheld if the requirements are not met.

Dr. Boness described the regulations in some detail, noting the provisions for avoiding conflict of interest on the IACUCs and the fact that the authority of the IACUC cannot be overridden by the research institution. He further noted that the regulations, while requiring the avoidance or minimization of discomfort, distress, and pain, also allow animals to be killed humanely as part of scientific research programs. The regulations apply to both laboratory and field research.

Issues that have been raised by USDA inspectors concerning IACUCs include:

- IACUCs do well at developing review processes, but less well at monitoring and following through.
- There are some specific weaknesses that have been observed in IACUCs:
 - Lack of power and authority
 - Undue influence by Principle Investigators
 - Failure of outside, public members to be active and representative
 - Inadequate reporting
 - Poor training of IACUC members on standards of care
 - Failure to recognize painful or stressful procedures
 - Inadequate effort to search for alternatives to painful or stressful procedures

Dr. Boness concluded by reiterating that the legislation in place does not prohibit research that causes pain, stress and injury, and allows for “humane” killing of animals for research. The decision to allow or disallow a project is a balancing of the level of harm against the scientific gain. Here there is no black and white or right and wrong. The final decision when “substantial” harm or death may occur comes down to the personal beliefs of the collective IACUC members.

Advisory Committee member Paul Nachtigall, a marine mammal researcher who is a member of the IACUC at the University of Hawaii, provided an outline of the process he must go through to conduct research on captive dolphins. He listed the following steps, which must be completed before he can begin a research project.

- Submit an application for a marine mammal research permit to NOAA Fisheries. The application is also reviewed by the Marine Mammal Commission, and is published in the Federal Register. This permitting process usually takes 6-8 months.
- Write a protocol for review by the IACUC (the blank application form is 14 pages). He noted that about 50% of protocols pass on first submission, and many never pass.
- Complete an assurance statement indicating that there is a functioning IACUC.
- Participate in annual reviews and twice yearly inspections of the laboratory
- Submit an annual report to NOAA Fisheries, the permitting authority under the Marine Mammal Protection Act.
- If funded by the Department of Defense, complete an additional Animal Care protocol, and submit to inspections by U.S. Navy veterinarians.

Following these two presentations, the Committee discussed what animal welfare issues are of most concern for research on marine mammals. The following comments were made in the discussion:

- For several environmental group representatives, controlled exposure experiments (CEEs) raise some animal welfare concerns because they involve intentional exposure of marine mammals to sound. Other environmental group concerns are that the exposure thresholds that may cause pain or stress are not agreed upon, and that research in which marine mammals are exposed to sound may not have a significant conservation benefit. They noted that CEEs can be limited in their benefits, given that they only provide information about short-term responses, and that they may not provide information about the full range of physiological and behavioral effects. Environmental group representatives recommended that alternatives to exposing marine mammals to sound be explored before CEEs were undertaken, and that researchers not allow the results of the CEEs to be misused or to be interpreted in a manner that is not precautionary.

- Researchers on the Advisory Committee expressed the desire to develop, with the Committee's support, potential guidelines to address concerns about CEEs involving acoustic impacts on marine mammals so that high priority research that is important to conserving marine mammals can go forward.
- Another Committee member asked if the concerns were broader than CEEs, and one member noted a concern about Auditory Brainstem Response (ABR) tests.
- In response to a question from one member about whether current regulations are adequate, other members noted that the regulations may be adequate, but they are not well enforced and that marine mammal research may require more specificity than the current regulations provide. Research designs may need to be justified more extensively to adjust for the potential harm that could arise during CEEs.
- One member suggested that in order for the risk of harm to subject animals from CEEs to be tolerable, it would be important to ensure that the results would be interpreted conservatively, that scientists would speak out against the mis-use of resulting data and that a real effort be made to translate results into meaningful policy.
- A member asked: what does the Committee want to tell Congress, and are there specific recommendations that the Committee would like to make? Another member responded that the Committee might want to highlight for Congress the potential harms and benefits of CEEs, as well as any safeguards the Committee might recommend regarding CEEs and other types of marine mammal research.
- A Committee member asked if animal welfare concerns are limited to directed marine mammal research, and not to all research that affects marine mammals, even incidentally. The response was that the directed marine mammal research is of most concern, and could be a good starting point for the development of guidelines specific to acoustic impacts on marine mammals.
- Another member expressed concern about creating barriers to answering important questions by developing extensive guidelines. Others spoke in support of addressing the barriers as much as possible to prevent delays in important research.

As a result of the conversation, the Committee agreed to establish an informal Working Group to examine animal welfare/ethics issues related to directed marine mammal research and to develop draft consensus language for consideration by the full Committee. Erin Heskett and Peter Tyack volunteered to co-chair the Working Group. The other members are Sarah Dolman, Mardi Hastings, Bill Lang, Paul Nachtigall, and David Cottingham (or another representative of the Marine Mammal Commission).

Report on NOAA Shipping Symposium

Roger Gentry, NOAA Fisheries, provided a brief overview of the NOAA-sponsored symposium on Shipping Noise and Marine Mammals that took place May 18-19, 2004. He reviewed the rationale for holding the symposium and the process of bringing partners and co-sponsors together. There were 203 registrants from government (40%), industry(22%), non-governmental organizations (17%), academia (13%) and others(8%). The symposium covered the following topics:

- Trends in the shipping industry and shipping noise (including global shipping patterns, tonnage and numbers of ships, etc.);
- Effects of noise on marine life (basic educational information for shipping industry);

- National and international responses to the marine noise issue (research programs, etc.);
- Developing technologies for monitoring marine noise (regional and global efforts, short and long term needs);
- Vessel quieting technology (including application and benefits—a discussion particularly helpful to industry, who has not had access to much of this information); and
- Future efforts and directions on this issue (including a panel discussion on potential roles of regulation and efforts to reduce noise using quieting technologies).

By way of follow-up there will be a Symposium Report expected to be available in the fall of 2004, and a planning committee has been formed to develop recommendations regarding possible actions and needed research sometime in the spring of 2005. A follow-on symposium is anticipated in the fall or winter of 2005. Abstracts of all of the presentations at the symposium can be found on the web at: <http://www.shippingnoiseandmarinemammals.com>.

In response to a question about whether the symposium addressed the relative contribution of shipping noise with regard to issues like masking, especially given recent International Whaling Commission identification of seismic sources as a contributor to masking, Dr. Gentry noted that there was a talk on shipping noise as a component of background noise in which masking was considered. He further noted that masking due to shipping noise is probably the most widespread effect on animals, especially since it is continuous, not pulsed.

In response to a question about the significance of the relatively sparse shipping industry participation, Kathy Metcalf responded. She noted that it is a struggle within the industry to get companies to actively participate in this issue. The good news is that Intertanko, a group representing tankers, participated. On the other hand, the groups representing cargo ships (smaller and faster than tankers) did not participate. However, the approach is to have a trade association (*e.g.*, Chamber of Shipping of America) take on the role of tracking the issues and educating members. Noise has never been an issue for the industry before. However, the biggest fear with this and other issues is to do nothing and then get hammered with regulations down the line, requiring retro-fitting or other onerous and expensive requirements. Ms. Metcalf noted that it is her goal to participate and help educate industry regarding potential solutions and actions – like building ships that are quieter.

Committee members made the following additional comments:

- Setting up a global noise monitoring system would be very useful. There is very limited information out there on ambient noise, except for mean levels. Coordination of efforts should be a priority. It might be helpful for the U.S. Navy to provide data for past years, although Navy representatives noted that much of the old Navy data along these lines has been thrown out due to costs associated with storage and transferring to newer media.
- It is good that ship-quieting technology was a key topic at the symposium. This Committee might want to consider a recommendation encouraging moving forward with these technologies either through voluntary industry action or legislation.
- The Maritime Administration (MARAD) and International Maritime Organization (IMO) have potential roles to play on this topic.

Report of Management and Mitigation Subcommittee

Subcommittee member Jim Ray presented the results of work to date by the Subcommittee on Management and Mitigation for review and approval by the full Committee. He reviewed the vision for the product, a detailed outline of the report or chapter that the Subcommittee would produce, and the schedule and workplan for the Subcommittee. (The draft outline and the schedule and workplan are attached to this summary.)

One important aspect of the Subcommittee's proposal, on which the draft outline is based, is the proposal to consider mitigation as part of the overall management system for acoustic impacts on marine mammals. The management system consists of the following parts: knowledge and research, risk assessment, permitting and other regulatory processes for managing impacts, mitigation tools, enforcement and compliance, and monitoring and evaluation.

The Subcommittee proposed to develop a draft chapter or report that outlines all of the elements of management and mitigation, including information on costs and limitations of specific mitigation techniques. The report will be written for a lay audience, and the Subcommittee will have preliminary drafting assistance from staff hired by the Marine Mammal Commission to work with the Subcommittee.

Committee members commented positively on the draft outline and workplan. Among the issues the Committee members asked the Subcommittee to take into account were:

- The need to integrate information from the London workshop on international policies into the Advisory Committee's product. Several Committee members encouraged some focus on international management and mitigation; others suggested starting with the U.S. experience and information, and adding international information as feasible;
- The need to link adaptive management with research and monitoring;
- The need to identify overlap and coordinate regarding recommendations with the Working Group established to look at improvements to the permitting system; and
- The need to address management and mitigation for all anthropogenic sound with impacts on marine mammals, not just those covered by the Marine Mammal Protection Act.

Regarding the interaction between the London international policy workshop and the Advisory Committee process, the Marine Mammal Commission noted that the London workshop report will be prepared as quickly as possible after the September 28-30 workshop, with a possibility of a draft of the workshop report being available in time for the November Advisory Committee meeting. The workshop report will be a stand-alone document published by the Commission and will not represent any consensus among the Advisory Committee members. However, its contents may be integrated in some manner into the Advisory Committee's final report if the Committee deems this appropriate.

The Subcommittee has scheduled meetings on July 30, September 14, October 13, and November 4. The Subcommittee plans to make a draft chapter/report available to the Committee by November 15, 2004, two weeks before the next Advisory Committee meeting.

Discussion of Strawman Outline of Full Committee Report

The Committee discussed a preliminary draft outline for its final report prepared by an ad hoc group that presented a proposed framework and vision for the Committee's product. The key sections of the proposed outline included the following items (proposed subsections are laid out in the full draft outline, Attachment C):

- Executive Summary
- Introduction
- State of Scientific Knowledge
- Mitigation and Management
- Research
- International Efforts to Reduce Impacts of Sound on Marine Mammals
- Comprehensive Summary of Recommendations
- Vision for the Next Decade(s)
- Appendices

Committee members raised the following points in the discussion of the outline:

- There was extensive discussion about how to organize the varied issues related to research: funding, permitting issues, animal welfare and ethics, bias issues, research related to mitigation vs. other research, and research priorities. More discussion is needed and will be better informed by the work being done by Subcommittees and Work Groups.
- A question was raised about whether the International section should include discussion of multilateral legal regimes.
- It was suggested that the introduction must provide the overall context, including acknowledgement of both the benefits and negative impacts of sound.
- It was suggested that the science section should include a section on strandings.

The Committee will revisit the development of an outline for its product. For immediate next steps, Committee members will provide comments on the draft outline to facilitators (including suggested language). The facilitators will then distribute a version of the outline that incorporates suggested changes.

Criteria for Prioritization of Scientific Research

To begin the process of considering criteria for prioritizing research, Lee Langstaff asked Committee members to offer examples of the characteristics that should make research topics rise to a high priority level. The purpose of this brainstorming process was to share perspectives and to start thinking about the basis on which the Committee will develop research recommendations. The following list emerged from this brainstorming session:

- Has importance for resource management decisions
- Contributes to baseline knowledge against which to measure impacts
- Data are available or easily compiled to make it available
- Reduces the need for management decisions
- Non-invasive (to marine mammals)
- Is likely to produce conclusive results
- Helps increase understanding of population effects
- Helps increase understanding of ecosystem effects

- Helps increase understanding of stress-related effects
- Clarifies relation between stranding events and sound
- Contributes to reducing sound at the source
- Reduces need for regulation
- Faces the fewest obstacles and is “do-able” (*i.e.*, go for the low-hanging fruit)
- Low cost and high return in terms of cost versus conservation and management benefit
- Expands the number of species for which there are direct data on hearing (studies on species not already being studied)
- Helpful in making judgments regarding impacts
- Most likely to produce information that can be transferable (*e.g.*, to different species)
- Breadth of implications for the whole field
- Relevance to big picture
- Contributes to overall conservation of marine mammals (*e.g.*, stock status and ecosystem effects)
- Related to “hot-spots” for activity zones or species distribution
- Contributes to understanding cumulative and synergistic effects
- Builds on existing data
- Complements existing conservation plans and recovery plans
- Takes advantage of existing captive animals (low cost/high return)
- Addresses public perception of the issue and has potential to reduce controversy
- Feasibility of yielding results
- Not duplicative
- Leverages other information or efforts
- Interdisciplinary approaches (biology, oceanography, acoustics, etc.)
- Addresses capacity problem – includes educational component for student learning

Ms. Langstaff asked Committee member to consider how they might use this information as they move forward. The following points of discussion were offered:

- This list can be used as a tool in our work to prioritize research recommendations.
- Before we can look at what rises to the top, we will have to fill in the specifics of these criteria and clarify what they mean.
- It may not be appropriate to use the same set of criteria for all types of research.
- The list mixes research topics with criteria. We would need to separate these out in order to make good use of criteria.
- We should ground-truth the criteria by applying them to research we know and agree is important.
- Once we can clean up and agree on criteria, they should go into the report to support and explain how we arrived at our priority research recommendations.
- We should go back to considering what decisions need to be made in near, mid, and long term and array priorities around the decision making needs.
- The National Science Foundation has standard criteria it uses to judge research proposals that it could share with this Committee.

It was agreed that further discussion related to the development of research priorities needs to take place at the full Committee level and should be a topic on the agenda for the next meeting.

Summary of Outcomes of Day Three

Suzanne Orenstein provided the following summary of actions and outcomes from this third day of the meeting:

- The Navy will seek, and provide to the Committee if possible, information regarding recent NATO exercises and the stranding incident off the Canaries
- NOAA Fisheries and the Navy will continue to examine circumstances surrounding the recent Hawaii melon headed whale stranding incident
- Established an ad-hoc Working Group on Animal Welfare/Ethics Issues to examine animal welfare issues related to directed marine mammal research and develop draft consensus language for consideration by the full committee
- Established an ad-hoc Working Group to examine and develop draft recommendations for possible improvements in marine mammal research permitting and incidental harassment authorizations for consideration by the full Committee.
- Brainstormed a preliminary list of criteria for prioritizing research.

Activities Between Now and Next Meeting

Ms. Orenstein summarized the activities that will take place between now and the next Advisory Committee meeting to be held in New Orleans November 30-December 2.

1. International Workshop – September 28-30
2. Subcommittee on Synthesis of Current Knowledge:
 - a. Comments on Subcommittee draft report to Erin Vos by Friday, August 13
 - b. Meetings in September and October, dates TBD
 - c. Products:
 - i. Revised draft incorporating Committee comments
 - ii. List of scientific research recommendations from previous efforts plus any they would add
3. Subcommittee on Management and Mitigation
 - a. Meetings on July 30, September 14, October 12, November 4
 - b. Products: Draft Report (Chapter)
4. Working Group on Integrity and Balance of Research
 - a. Conference call as soon as possible – Orenstein to arrange
 - b. Product: Recommended content and approach for addressing issue in final report
5. Working Group on Animal Welfare/Ethics Issues
 - a. Co-chairs (Heskett and Tyack) to convene conference call
 - b. Products: Draft consensus language on this topic for final report
6. Working Group on Research Permitting and IHAs
 - a. Chair: Nina Young.
 - b. Members: Steve Leathery (in coordination with Charlie Chandler), Penny Dalton, Mike Reeve, Sara Wan, Bob LaBelle, David Cottingham (or other Commission representative), Peter Worcester
 - c. Chair will convene a conference call

- d. Product: Recommended language for final report, including potential recommendations, for Committee consideration in November
7. Facilitators to gather all recommendations from Subcommittees and Working Groups and provide to Committee members before November meeting
8. Committee members to provide comments on draft outline of final report to facilitators (including any suggested language)

Items for Meeting Four Agenda

The following items were identified for inclusion on the agenda for discussion at the fourth meeting in New Orleans:

1. Revised draft report from Subcommittee on Synthesis of Current Knowledge
2. Draft report from Subcommittee on Management and Mitigation
3. Proposal from Working Group on Integrity and Balance of Research
4. Proposal from Working Group on Animal Welfare/Ethics Issues
5. Proposal from Working Group on Research Permitting and IHAs
6. Report from International Policy Workshop
7. Discussion of how we will deal with scientific uncertainty in our final products (e.g., precautionary approach)
8. Discuss how we will deal with disagreement in final report
9. Consider appointing drafting team
10. Discuss any potential recommendations
11. Research priorities

There was general support for the suggestion that there be time built into the meeting for small groups to meet to develop proposed language for the Committee on a variety of issues. Time for caucuses to meet as needed would also be desirable.

It was suggested that the fourth meeting might need to be extended by at least a half day in order to be able to address all of these items. The Commission will look into this possibility.

Another suggestion was made to add another meeting before the final one in February in order to ensure that there is sufficient opportunity for joint development and discussion of recommendations. The Commission also agreed to consider this possibility.

There was little support for a suggestion that the group meet in a non-public executive session.

Meeting Evaluation

Ms. Orenstein asked Committee members to provide feedback on how this meeting went, including suggestions for changes that could be incorporated into future meetings. Committee members provided the following comments:

- This has been the best meeting to date. We are starting to pull together as a team and build trust in one another.
- The shift away from presentations to more direct interaction is a great improvement.
- Future meetings should definitely be able to accommodate more small group work.
- There is no longer a sense that a chairperson is needed.

Ms. Orenstein thanked the group for their work and adjourned the meeting.

ATTACHMENTS

- A. Meeting participants and attendees
- B. Draft outline and workplan for Subcommittee on Management and Mitigation
- C. Strawman Draft Outline for Final Report

ATTACHMENT 1

Attendance at the Third Plenary Meeting of the Advisory Committee on Acoustic Impacts on Marine Mammals

Committee Members

Kenneth Balcomb, III	Center for Whale Research, Inc.
David Cottingham	Marine Mammal Commission
Sarah Dolman	Whale and Dolphin Conservation Society
Chip Gill	International Association of Geophysical Contractors
Marsha Green	The Ocean Mammal Institute
Erin Heskett	International Fund for Animal Welfare
John Hildebrand	Scripps Institution of Oceanography
Kathy Metcalf	Chamber of Shipping of America
Paul Nachtigall	Hawaii Institute of Marine Biology
RAdm. Dick Pittenger, USN (Ret.)	Woods Hole Oceanographic Institution
G. Michael Purdy	Lamont-Doherty Earth Observatory
James Ray	Shell Global Solutions (US), Inc.
Joel Reynolds	Natural Resources Defense Council
Naomi Rose	Humane Society of the United States
Charles Schoennagel	Minerals Management Service
V. Frank Stone	Office of the Chief of Naval Operations (N45)
Buck Sutter	National Marine Fisheries Service
Bruce Tackett	ExxonMobil Corporation
RAdm. Steven Tomaszewski	Office of the Chief of Naval Operations (N61)
Peter Tyack	Woods Hole Oceanographic Institution
Sara Wan	California Coastal Commission
RAdm. Richard West, USN (Ret.)	Consortium for Oceanographic Research and
Education	
James Yoder	National Science Foundation
Nina Young	The Ocean Conservancy

Alternate Committee Members

Dan Allen	ChevronTexaco Corporation
Mark Delaplaine	California Coastal Commission
Michael Jasny	Natural Resources Defense Council
Jim Kendall	Minerals Management Service
RAdm. Tim McGee	Office of the Chief of Naval Operations (N61)
Alexander Shor	National Science Foundation
Lindy Weilgart	Dalhousie University
Donna Wieting	National Marine Fisheries Service

Presenters

Daryl Boness

Smithsonian Institution (Emeritus), Marine Mammal
Commission—Committee of Scientific Advisors

Staff

Alyssa Campbell
Tara Cox
Erin Vos

Marine Mammal Commission
Marine Mammal Commission
Marine Mammal Commission

Facilitators

Lee Langstaff
Suzanne Orenstein

Independent Facilitator
Independent Facilitator

Observers (43)

Linda Bauch
Deborah Ben-David
Mark Berman
Robert Brownell, Jr.
Jack Caldwell
Colleen Corrigan
Brendan Cummings
Marc Dantzker
Cynthia Decker
David Fromm
Robert Gisiner
Michael Goodwin
Mardi Hastings
Ruth Howell
Hallie Austen Iglehart
Steve Insley
Scott Kenney
Jeus Koblitz
Karen Kohanowich
Stephen Leathery
William Lynn
Bruce Mate
Rodger Melton
Guy Oliver
Joel Ortega
Ingrid Overgard
Don Perkins
Linda Petitpas
Deanna Rees

Animal Petroleum Institute
National Oceanic and Atmospheric Administration
Earth Island Institute
Southwest Fisheries Science Center
Consultant
U.S. Fish and Wildlife Service
Center for Biological Diversity
Cornell Laboratory of Ornithology
Office of the Chief of Naval Operations (N61)
Naval Research Laboratory
Office of Naval Research

Office of Naval Research
Gulf of the Farallones National Marine Sanctuary
Seaflow
University of California—Santa Cruz
U.S. Navy
Cascadia Research
U.S. Navy
National Marine Fisheries Service
Practical Ethics
Oregon State University
ExxonMobil
University of California—Santa Cruz
Oregon State University
Seaflow
Gulf of Maine Research Institute
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Minerals Management Service

HMMC
Minerals Management Service

ATTACHMENT 2

Management and Mitigation of Acoustic Impacts on Marine Mammals

Draft Report Outline

**Developed by
Subcommittee on Management and Mitigation
of
Advisory Committee on Acoustic Impacts on Marine Mammals**

1. Introduction

- a. Definitions and purposes of mitigation and management of acoustic impacts on marine mammals
- b. Include vision with elements of ideal program
- c. Discussion of how acceptable risk is determined and how uncertainty is handled

2. Description of the requirements for management of impacts

- a. Statutory basis: briefly summarize requirements of MMPA, ESA, NEPA, OCS Lands Act, CZMA
- b. Consider adding information about international requirements after see results of International Policy Workshop

3. Sound sources subject to management

- a. To what extent is each sound source subject to management and mitigation
- b. List regulated and unregulated sources (draw on Table of Mitigation Tools, Synthesis of Current Knowledge, and 2003 NRC report)

4. Components of Management Systems

- Overview of how components fit together, including a graphic description
- a. **Knowledge, Information and Research**
 - i. Purposes in management systems
 - ii. Knowledge and information needs
 1. what [resource] is out there?
 2. what are the responses to signals, including at the population and individual level?
 3. what are the signal?
 4. what are the effects of mitigation?
 5. what is normal?
 - iii. Research
 1. Gathering the information noted above in 4(a)(ii)
 2. Learning how to gather it

3. Biological information, including status and distribution of marine mammals (what is “normal”)
4. Technology development for mitigation techniques
5. Evaluating effectiveness of proposed or actual mitigation strategies
6. Development of additional information

b. Risk assessment

- i. Purpose
- ii. Role of risk assessment in management systems
- iii. Who does it?
- iv. How is it done?
- v. What do we know and not know about it?
- vi. How are uncertainties identified and dealt with?

c. Permitting and other regulatory processes

- i. Purposes
- ii. Who does it/for what activities/how?
- iii. Listing of permitting and regulatory processes in U.S., with summary and examples of international regulatory processes
- iv. Potential alternatives to command and control regulations, including non-regulatory options

d. Mitigation Tools

- i. List existing and potential methods and outline briefly for each:
 1. Description
 2. Purposes
 3. Extent of current uses
 4. Potential additional/innovative applications and issues re: utilization
 5. (what do we know and not know about effectiveness)
 6. Limitations or gaps
 7. When each is most useful
 8. Practicalities: costs, etc.

e. Enforcement and compliance, including reporting

f. Monitoring and evaluation

- i. of mitigation tools
- ii. Impacts on marine mammals
- iii. Compliance

5. Policy Issues - For Example:

- a. Jurisdictional issues (including international)
- b. Adaptive management
- c. Target of concern/management (population, individual)
- d. Statutory changes (e.g., PBR or similar approach, non-regulatory programs)

- e. Others to be added

6. Potential Recommendations

ATTACHMENT 3

Outline of Final Report as Revised at Meeting 3

Draft Outline (Version 2, as revised July 29, 2004)

Final Report

Advisory Committee on Acoustic Impacts on Marine Mammals

Executive summary

Introduction

Process description (mostly contained in appendix)

Context (acknowledge benefits of using sound in ocean including lack of alternatives to accomplish goals of use of sound, and marine mammal concerns that arise.

How we got here

State of Scientific Knowledge

7. Introduction (cite appendix? Or include the section?)
8. What we know
9. Uncertainty
10. Disagreement
11. (To peer review or not to peer review?)
12. Strandings
13. Scientific information needs
14. Conclusions and recommendations
 - a. Priorities

Research Issues (or move after Mitigation and Management?)

1. Current status and adequacy of marine mammal research funding by government and their partners?
2. How should government and their partners fund marine mammal research (process)?
3. Coordination and Access to Research
4. Permitting of research efforts
 - a. Streamlining research permitting
5. Animal welfare considerations
6. Information need prioritization (process)
7. Conclusions and recommendations

Mitigation and Management

1. Introduction (cite appendix? Or include the section?)
2. Description of the requirements for management of impacts
3. Sound sources subject to management
4. Components of Management Systems
 - a. Research
 - b. Risk assessment
 - c. Permitting and other regulatory processes
 - d. Mitigation Tools

- e. Enforcement and compliance, including reporting
 - f. Monitoring and evaluation
- 5. Policy Issues
- 6. Conclusions and recommendations
 - a. Mitigation priorities, including mitigation-related research

International Efforts to Reduce Impacts of Noise on Marine Mammals

- 1. Summary of International workshop
 - a. Conclusions and recommendations
- 2. Domestic practices in other countries
- 3. International and regional legal conventions

Comprehensive Summary of Recommendations

- 1. [Overlaps, differences and gaps from previous reports (NAS studies, Oceans Policy Commission, Pew Oceans Commission, IWC, others?)]
- 2. Rolled up priorities

Vision for the Next Decade(s)

Appendices

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Process (members, meetings, FACA Charter, Assessment Report)
 Mitigation report
 Beaked whale workshop report
 International workshop report
 Etc...